FLORIDA

Department of Environmental Protection

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Governor

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2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

May 1, 2000

Mr. Bill Hill
Code 1851
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
P.O. Box 190010
North Charleston, South Carolina 29419-9010

RE: Feasibility Study Report, Site 38, NAS Pensacola

Dear Mr. Hill:

I have completed the technical review of the above referenced document dated November 17, 1999 (received November 22, 1999). Please see the attached memorandum from Mr. Greg Brown, P.E. In addition tu the comments from Greg Brown I have the following comments that should be addressed in the document.

1. Page 2-5: The statement that Rule 62-777 identifies the FPDWS and FSDWS as potential criteria for groundwater is incorrect. The FPDWS and FSDWS are defined in Chapter 62-550 FAC and are ARARs. Chapter 62-777 does identify GCTLs which are to be considered in developing remedial goals for the site.

2. Page 3-16, Second Paragraph: This paragraph states that lead was reanalyzed for in six wells; however, my review of Table 3-1 indicates seven wells were reanalyzed for lead. Two wells exhibited an Increase in lead concentrations; five wells exhibited a decrease in lead concentrations; and eleven wells were not reanalyzed for lead. Based on my review, it is not clear that there is an overall decrease in lead concentration as stated at the bottom of Page 3-16.

3. Pages 3-41 and 3-42: It is stated that inorganic concentrations observed from the 1994 data may be biased high due to the sampling techniques that were employed and that concentrations are expected to be lower if sampling events are repeated using low-flow methods. It is also stated that the data suggest

Mr. Bill Hill
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inorganics are not a primary concern at the Buildins 71 site. Without resampling those specific monitoring wells and analyzing for the analytes of concern, there is no data to support this statement.

4. Page 3-53, Section 3.2, Remedial Goals: Currently, there is no legislative authority to grant a variance to low yield/low quality criteria unless the site falls under the Petroleum, Drycleaning, or Brownfields Program. Alternative cleanup levels may be demonstrated using facility specific background values or by seeking a reclassification of the groundwater aquifer from G-II to G-III. The development of reference values (particularly for lead) for the older historic portion of the facility as well as the possibility of the Navy seeking a reclassification of the aquifer from G-II to G-III was discussed during several partnering meetings in 1999. Given the proximity of Site 38 to Pensacola Bay, I recommend that groundwater analytical data from the site be reviewed to determine if reclassification is appropriate as defined in Chapter 62-520.410 F.A.C.

5. Page 3-53, Table 3-5: Of the 29 analytes or compounds with RGs listed on this table, 14 are primary drinking water standards and 1 is a secondary drinking water standard. The remaining 14 compounds have criteria listed in Chapter 62-777 that should be considered. Two compounds on the table have incorrect criteria listed. 2,4-Dinitrotoluene and 1,1,2,2-Tetrachloroethane have criteria of 0.01 and 0.2 ug/L, respectively.

6. Page 3-74: One statement on this page indicates that chromium and cadmium concentrations are increasing in down gradient groundwater monitoring wells at Building 604 yet a subsequent statement on the same page indicates that the contaminant plume is stable. These two statements seem to contradict each other since an increase in down gradient concentrations suggests that the plume is moving down gradient and therefore is not stable.

7. Page 3-76, MNA Criteria No. 3: If ground water discharges to a surface water body at concentrations exceeding the MSWQ criteria, then MNA is potentially not the remedy of choice. Monitoring of groundwater or surface water at the mint of discharge would then be required. The assumption that this remedy is protective based only on the assimilative capacity (or dilution effects) of Pensacola Bay is rather weak.

8. Page 3-76 and 3-77, MNA Criteria No. 5: It is stated in this paragraph that if contaminated groundwater were to discharge to Pensacola Bay, the assimilative capacity of the system would likely absorb the discharge without impacting the bay. Again, MNA is potentially not the remedy of choice if contaminated groundwater is discharging into the Day.

9. Table 3-15, Comparative Analysis of Groundwater Alternatives: It would be helpful to include the estimated time to achieve cleanup for each alternative on this table.

10. Page 4-2: The paragraph on this page states that arsenic is ubiquitous across the site and then later states that arsenic contamination above the reference concentration (RC) as sporadic and inconsistent with depth, indicating the absence of a significant source area. My review of the data indicates that there are wide spread occurrences of arsenic **probably** from multiple sources; however, at least one fairly significant source exists under Building 71.

11. Page 4-2: The paragraph on this page states that chromium is quantified above RSCTLs in three borings but that the other seven borings below Building 71 did not exhibit levels above RSCTLs. My review of the data indicates that at least one fairly significant source of chromium exists under Building 71.

12. **Page** 4-7: A sentence on this page indicates that there **is** no significant PCB source area. My review of the data indicates that **at** least one fairly significant source of PCBs exists under Building 71.

13. Pages 4-11 through 4-18, Section 4.1.1.3, Building 71 Comparison with Leaching Values Protective of Groundwater: This section presents data for five analytes and compounds that exceeded Florida soil leachability criteria and that were also **detected** in groundwater samples. The discussion for each analyte and compound also concludes that there is no significant source area in the soil and that there is no significant threat to groundwater at the site. My review of the data indicates that there is a significant source area beneath Building 71 and that the groundwater is impacted. Chromium values in particular greatly exceed the Florida soil leachability criteria.

14. Page 4-12, Footnote 2: This footnote discusses the assumptions used for calculating the soil leachability values published in Chapter 62-777 F.A.C. It states that a source area of 0.5 acres is greater than the area associated with a borehole exceedence and therefore, the published value is not appropriate. Other factors, such as depth to groundwater, must also be considered to calculate site-specific values. Rather than discount the value calculated in Chapter 62-777, the Navy should consider calculating site-specific values using the equation in Figure 8, located in Appendix A of Chapter 62-777 F.A.C.

15. Page 4-19: The first two paragraphs at the top of this page seem to be misplaced and may belong within Section 4.1.1.4 at the bottom of this page. In addition, some of the Mercury discussion at the end of the second paragraph is apparently missing.

16. Page 4-61, Section 4.3, Site 38 Soil Alternatives: Soil Excavation of hotspots should be considered as an alternative for this site since there are source areas obviously leaching into the groundwater despite large areas of concrete or asphalt cover already in place.

17. Pages 4-65 and 4-46: The discussion regarding remedial activities for the asphalt cover on the bottom half of page 4-65 and Implementability on top of page 4-66 seemed to be misplaced and should be moved to Section 4.3.3, Alternative S3, Asphalt Cover.

18. Table 4-15, Comparative Analysis of Site 38 Soil Alternatives: It would be helpful to include the estimated time to achieve cleanup for each alternative on this table.

19. Appendix G, Chromium Leaching Evaluation: The assumption that a concrete cap is protective may be wrong considering that any fluctuation of the relatively shallow groundwater elevation may place contaminated soil in direct contact with a leaching agent on a daily basis.

I recommend that a comparative analysis for excavation of hotspots be added to the comparative analysis for soils. In addition, site-specific soil leachability values may also be determined if the Navy believes that the published values are not representative of conditions at the site.

Since Site 38 is adjacent to Pensacola Bay, I recommend that existing groundwater data be reevaluated to determine if a groundwater reclassification from G-II to G-III is appropriate. The Navy may also want to consider a reevaluation of the existing facility background groundwater data set and any additional background groundwater data associated with the older historical portion of the facility in order to develop more representative groundwater reference concentrations.

If I can be of any further assistance with this matter, please contact me at (850) 921-9989.

Sincerely,

Joseph F. Fugitt

Joseph F. Fugitt, P.G.
Remedial Project Manager

cc: Ron Joyner, NAS Pensacola
Gena Townsend, USEPA Region IV
Brian Caldwell, EnSafe, Knoxville
Allison Harris, EnSafe, Memphis
Terry Hansen, Tetra Tech NUS, Inc., Tallahassee
Charlie Goddard, FDEP Northwest District

TJB TJB JJC JJC ESN ESN

Memorandum

Florida Department of
Environmental Protection

TO: Joe Fugitt, P.G., Remedial Project Manager, Technical Review Section

THROUGH: Tim Bahr, P.G., Supervisor, Technical Review Section TB

FROM: Greg Brown, P.E., Professional Engineer II, Technical Review Section

DATE: March 9, 2000

SUBJECT: Feasibility Study Report, Site 38, NAS Pensacola, Florida

I reviewed the subject engineering document dated November 17, 1999 (received November 22, 1999). Ms. Elizabeth Barnett, P.E., Florida PE Number 0050413, is the engineer of record for this engineering document. I reviewed an earlier version of this document dated September 1997 (received September 16, 1997). I provided your predecessor, Mr John Mitchell, comments in a memorandum dated October 16, 1997. I do not know if the Navy provided formal responses to my earlier comments. If not, the Navy should provide a written response so that we may complete that portion of the administrative record. I have attached a copy of the October 16, 1997, memorandum for your convenience.

Although circumstances have overtaken some of my earlier comments, some of the issues remain current after more than two years. In general, I still worry that the alternative analysis described in this feasibility study does not give a sufficiently broad range of alternatives for risk managers to assess. I concur in principle with those few alternatives proposed in the subject document. Their rationale and scope, however, are flawed and limited in my judgment.

I identify in these comments the feasibility study's weaknesses and suggest improvements. I give representative examples to illustrate my points rather than list detailed specific comments since the weaknesses I observe are fundamental affecting the feasibility study as a whole.

GENERAL COMMENTS.

The U.S. EPA's guidance for conducting remedial investigations and feasibility studies is based on a program implementation and evaluation model commonly used by federal agencies. This model emphasizes public policy factors complicating the specific engineering tasks of alternatives development, screening, and analysis. A strength of this model when it is followed in good faith, however, is that it creates a reasonable range of unbiased alternatives for risk managers to judge tradeoffs between protectiveness and cost-effectiveness (disclosing the model's roots in public policy cost/benefits analysis).

Feasibility studies consist of three phases: development, screening, and analysis of alternatives, The first two phases are often combined into six sequential processes of which the first three are important to the context of the subject document. Briefly, these first three sequential processes are: develop remedial action objectives; develop general response actions; and identify volumes or areas of contaminated media.

Chapter 2.0 of the subject document describes a standard feasibility study framework including these first three sequential processes. The feasibility study departs from the standard framework in practice, however, by placing the third process, *identify* volumes *or areas* of contaminated media, at the very beginning. The majority of the document then addresses itself to eliminating a large portion of contaminated media from further consideration before remedial objectives or response actions are considered. The criteria used to eliminate contaminated media are subjective or based on speculative assumptions not supported with factual data.

The following are examples of subjective or speculative rationale used to eliminate contaminated media:

- Page *3-2:* "VOC decreases since the RI are expected to be attributable to natural attenuation process. . These processes will be discussed further in Alternative G2: Monitored Natural Attenuation."
- Page 3-16: "Overall, lead concentrations have declined, possibly due to precipitation within the aquifer as lead sulfide."
- Page 3-17: "SVOC contamination is not consistent across the site, and no significant mass appears to be present in Site 38 wells."
- **Page** 3-*17*: **"No** impacts are anticipated, due to the bay's assimilative capacity and the dilution/mixing which occurs at the groundwater-surface water interface,"
- Page 3-18: "Mercury was not quantified above MSWQ in wells downgradient, suggesting no continuous mercury plume in groundwater."
- Page 3-18: "These data suggest that cadmium is not a widespread contaminate in groundwater and that source mass within the aquifer is negligible."

- Page 3-18: "*These* data suggest that nickel is not widespread contaminant in groundwater and that source mass within the aquifer is negligible."
- Page 3-30: "The irregular detections suggest cyanide is not a widespread aquifer problem."
- Page 3-30: "However, groundwater data indicate that PAHs are not a widespread problem in groundwater and do not pose a threat to the adjacent marine water body."
- Page 3-30: "It is unlikely that a significant source mass of BEHP is present within the aquifer, and therefore no threats to Pensacola Bay are anticipated."
- Page 4-2: "Arsenic contamination above the RC, therefore, is sporadic and inconsistent with depth, indicating the absence of a significant source area."
- Page 4-7: "PCBs were identified in boring 38S18 in the -01, -03, -05 intervals, but surrounding borings did not quantify PCBs above RSCTLs, indicating there is no significant PCB source area."
- Page 4-12: "These data, therefore, indicate that the 38S14 exceedance is not a significant source area for chromium."
- Page 4-17: "1998 data suggest chromium is not a concern in groundwater at Building 71."
- Page 4-18: "PCE's impact on the underlying aquifer appears limited, therefore PCE quantified in soil at Building 71 will nut be considered a significant threat to groundwater."
- Page 4-18: "These data suggest limited spatial impact on the aquifer, if any. Consequently, TCE will not be considered a significant threat to groundwater at Building 71."
- Page 4-20: "Because it has a limited spatial impact on the aquifer, data suggests PCE is not leaching appreciably to groundwater."

These examples and others are contained in Sections 3.0 and 4.0 and make up the bulk of the feasibility study. These rationale could be reasonable and based on good judgment, but the information presented in the feasibility study does support them in most cases.

I observed a similar strategy using subjective and speculative criteria in the earlier September 1997 document (refer to the memorandum dated October 16, 1997, comment no. 2). In the earlier document, for example, volumes of contaminated soil were eliminated by arbitrarily adjusting "Preliminary Remediation Goals" upward by one order of magnitude. The present document abandons that strategy for a more direct reductionist approach illustrated in the examples above.

Upon eliminating contaminated media from consideration in the feasibility study, the subject document proposes the following "remedial goals" and Remedial Action Objectives:

- Groundwater - Florida MCLs
- Soil -
  - "Protect the health of current and future site workers. ISCTLs will be used as RGs."
  - "Protect the environment by ensuring soil-to-groundwater transfers are minimized."
  - "Protect the environment by minimizing transfer of contaminants to adjacent water bodies (p. 4-52)."

With the exception of the groundwater remedial goal, the RAOs are vague and fail to identify the contaminants of concern, exposure routes, or receptors. The alternatives that are finally developed, screened, and analyzed after eliminating contaminated media and using these RAOs give risk managers a limited range of options and do not appear to adequately address site conditions as described in the subject document.

In the following two sections, I provide a counter analysis that tries to synthesize the reported site data so that a broader range of alternatives can be considered. I do not repeat the feasibility study, but instead try to demonstrate an alternative method to assess the site data that would correct the limitations I describe above. I am constrained to use the factual data reported in the feasibility study.

BUILDING 71

I ranked the reported Building 71 soil boring data assuming that the screening between appropriate soil cleanup target levels and analytical data was accurate in the feasibility study. The attached Pareto diagram summarizes the ranking results (I hope the diagram is self-explanatory upon inspection).

Borings with one or more exceedances of a SCTL are presented in the diagram. For example, boring 38S12 had one or more contaminant concentrations that exceeded the residential (red), industrial (yellow), groundwater leachability (red), and marine surface water leachability (blue) Soil Cleanup Target Levels (SCTLs). Boring B-T05 had one or more contaminant concentrations that only exceeded the residential SCTLs. Other borings are intermediate to these extremes and are sorted to show their relative contamination rankings as screened against SCTLs.

The Pareto diagram is useful as a heuristic tool to rank soil information categorically in order to identify areas of concern and to disclose an hierarchical response strategy. For example, the feasibility study assumes that Site 38 will remain zoned industrial land use presuming that land use restrictions are an optimum choice to maximize protectiveness and cost-effectiveness. There are opportunity costs with land use restrictions, however, that the risk managers should consider. Regardless, the soil volumes represented by borings labeled in "red" in the diagram that exceed residential SCTLs could be managed in principle by land use restrictions.

The next tier of response would be for soil volumes represented by borings labeled in "yellow" on the diagram with contaminant concentrations that exceed industrial STCLs. General response actions for soil could include excavation, treatment, disposal, and containment, or combinations of these actions. The feasibility study proposes capping (containment) with institutional controls to respond to risks posed by contaminated soil at these locations, Alternatives that include excavation, treatment, and disposal should also be considered to insure risk managers have an optimum range of options.

The need to consider alternatives that include general response actions for soil such as excavation, treatment, and disposal, as well as containment and institutional controls, is further reinforced at the next tier of response. Soil volumes represented by borings labeled in "green" in the diagram have contaminant concentrations that exceed leachability SCTLs (groundwater). Only a minority of locations remains with leachability concerns if adequate alternatives could be proposed to address contamination exceeding residential and industrial SCTLs. These remaining locations are represented by borings 38S16, 38S19, 38S7, 38S8, 38S15, 38S17, 38S9, and 38S10.

The table attached to the Pareto diagram summarizes the contaminants found in those soil borings that exceeded One or more SCTLs. Water quality data from nearby or downgradient monitoring wells are also listed in this table. TCE and chromium are both found above the SCTLs for leachability (groundwater). Lead is also found at concentrations above the residential SCTL and in groundwater samples. These data indicate that soil with exceedances above the leachability SCTL is a continuing source of contamination to groundwater. Given that Building 71 is reported "capped" with asphalt already, alternatives that depend solely on containment do not appear feasible based on site data. A broader range and *scope* of alternatives are thus necessary.

BUILDING 604

I conducted a similar analysis with the data from Building 604. Building 604 is a larger site and more complex. I am not able to analyze Building 604's data in depth because of time constraints from competing projects. Nonetheless, I obtain conclusions similar to Building 71. Focusing on soil contamination near monitoring wells 38GS07 and 38GS19, metal contamination in both soil and groundwater is apparent (lead, cadmium, chromium). PAHs in soil and groundwater may also be of concern towards the southwest corner of Building 604. Again, alternatives that provide risk managers broader ranges and scopes of options should be formulated so that fully informed tradeoffs between protectiveness and cost-effectiveness can be judged.

RECOMMENDATIONS

- Use U.S. EPA feasibility study guidance by following the sequence: develop remedial action objectives specifying the contaminants and media of interest, exposure pathways, and preliminary remediation goals that permit a range of treatment and containment alternatives to be developed; develop general response actions for each medium of interest defining containment, rreatment, excavation, pumping, or other actions; and then, identify volumes or areas of contaminated media to which general response actions might be applied, taking into account the requirements for protectiveness as identified in the remedial action objectives and the chemical and physical characterization of the site.
- Follow through with the subsequent feasibility study steps to present risk managers alternatives representing a range of treatment and containment combinations.
- Provide reasonable scientific evidence that will withstand scrutiny by peers that discharge of contaminated groundwater to surface water is not occurring at levels greater than appropriate surface water quality standards or at levels that adversely effect human health or natural resources (refer to memorandum, October 16, 1997, comment no.1). If these data do not support those conclusions, insure that the remedial action objectives address this discharge to surface water.
- The Navy should seek reclassification of the aquifer if as claimed in the subject document, the aquifer is of "demonstrated overall poor quality," presumably under natural background conditions. The process and data required for seeking reclassification are described in the following:

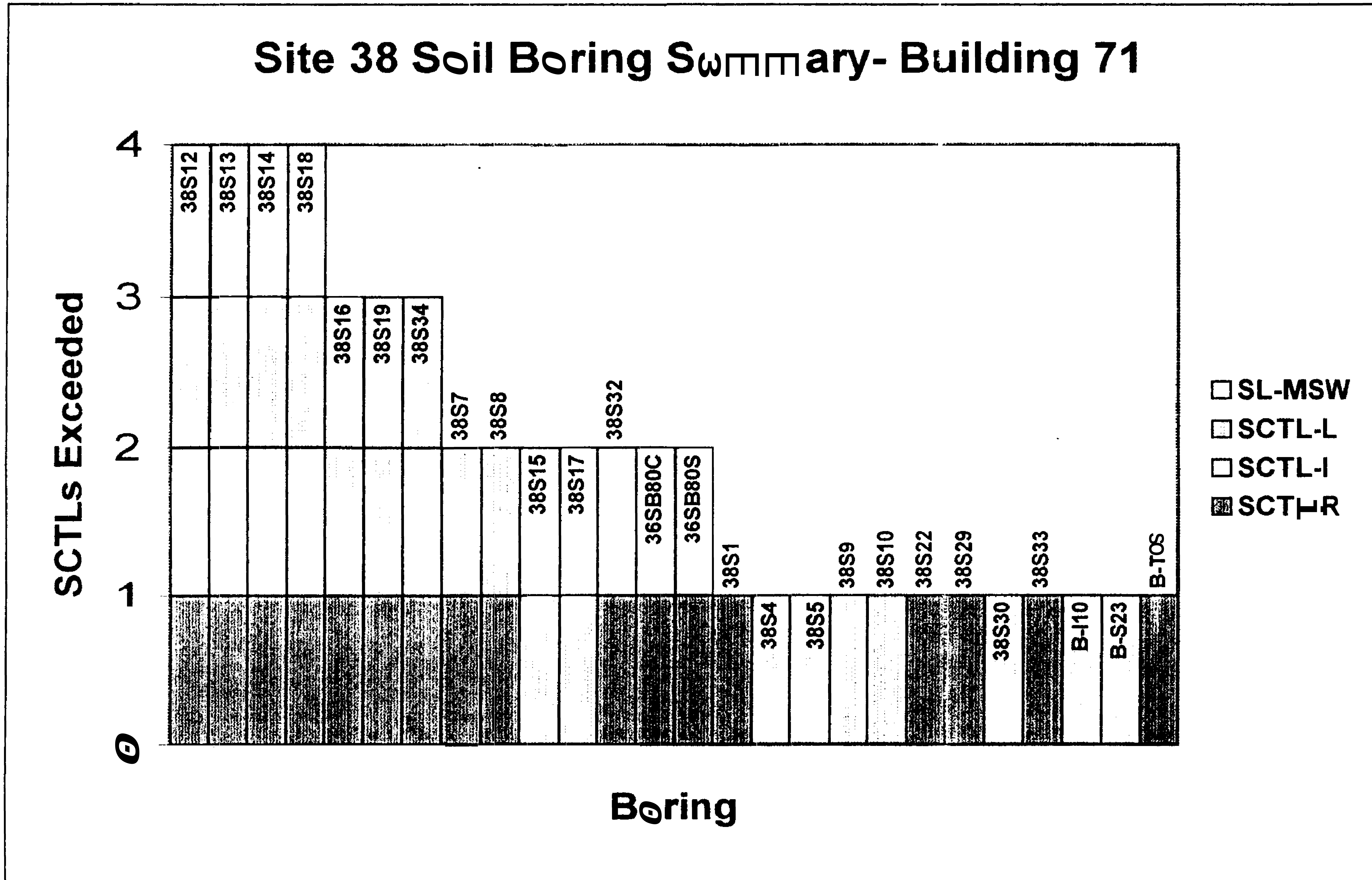
> **62-520.410 Classification of Ground Water, Usage, Reclassification.**
> (5) Reclassification of ground water as provided in subsection (1) above shall be accomplished in the following manner:
> (a) Any substantially affected person or a water management district may seek reclassification of any ground water of the State by filing a petition with the Secretary in the form required by Rule 62-103.040, F.A.C. In addition, the Department, on its own initiative or at the direction of the Commission, may seek reclassification by initiating rulemaking pursuant to Rule 62-102.010, F.A.C.

> (b) A petition for reclassification shall contain the information necessary to support the affirmative findings required in this rule.
> (c) All reclassifications of ground water of the State shall be adopted after public notice, written notification to local governments whose jurisdiction includes any portion of the ground water proposed to be reclassified, and public hearing, only upon an affirmative finding by the Commission that:
> 1. The proposed reclassification will establish the present and future most beneficial use of the ground water; and
> 2. Such a reclassification is clearly in the public interest.
> (d) Reclassification of ground water of the State which establishes more stringent or less stringent criteria than presently established by this Chapter shall be adopted upon additional affirmative finding by the Commission that the proposed designated use is attainable, upon consideration of environmental, water quality, technological, social, economic, and institutional factors.

- Rather than discount the recommended SCTLs published in Chapter 62-777, F.A.C., based on speculation, the Navy should obtain representative site specific data and calculate alternative CTLs consistent with the methodologies described in "Development of Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., May 26, 1999."

If you have questions, please call me at (850) 488-3935.

Attachments


Site 38 Soil Boring Summary- Building 71
SCTLs Exceeded
4
3
2
1
0
38S12
38S13
38S14
38S18
38S16
38S19
38S34
38S7
38S8
38S15
38S17
38S32
36SB80C
36SB80S
38S1
38S4
38S5
38S9
38S10
38S22
38S29
38S30
38S33
B-I10
B-S23
B-TOS
Boring
SL-MSW
SCTL-L
SCTL-I
SCTL-R

Site 38 Selected Soil Boring and Monitoring Well Data – Building 71					
Boring	**Contaminant**	**Conc.**	**Well**	**Contaminant**	**Conc. ug/l**
38S07	Arsenic **Lead** **TCE** Mercury	**2.4 mg/kg** **425 mg/kg** **110 uglkg** **0.05 mg/kg**	38GS03	Antimony **Lead** Benzene **TCE**	70 88.5 **2** **4**
38S08	Benzo(a)pyrene TCE Mercury	**230 ug/kg** **33 ug/kg** **0.07 mg/kg**	38GS05	Cadmium Lead	9.7 55.8
38S09	**TCE**	**36 uglkg**	38GS03	Antimony Lead Benzene **TCE** VC	70 88.5 2 **4** 3
38S10	Chromium **TCE**	**103 mglkg** **94 ugikg**	38GS03	Antimony Lead Benzene **TCE** VC	70 **88.5** 2 **4** **3**
38S15	Phenol	**130 uglkg**	38GS13 38GS02	Nu **Excedances** Reported No **Excedances** Reported	
38S16	Arsenic Vanadium Chromium Mercury Endosulfan II	**2.2 mg/kg** **16.6 mg/kg** **58.8 mglkg** **0.07 mglkg** **5.80 ug/kg**	38GS11	Lead Chloroform	20.1 5.7
38S17	**Chromium**	**53.4 mglkg**	38GS12	Antimony Arsenic Cadmium **Chromium** Lead Naphthalene 1,1,1-TCA 1, 1-DCA 1,1-DCE 1,2,4-Trimethylbenzene 1,3,4-Trimethylbenzene 1,3,5-Trimethylbenzene 1,1,2,2-PCA Chloroform PCE TCE **VC**	180 102 50 **326** 280 **44** 770 *640* **42** 23 12 100 100 **24** 102 **53** 15

Site 38 Selected Sail Boring and Monitoring Well Data – Building 71					
	Contaminant	Conc.	Well	Contaminant	Conc. ug/l
	Arsenic	1.9 mg/kg	38GS12	Antimony	180
	Phenol	600 ug/kg		**Arsenic**	102
	Mercury	0.06 mg/kg		Cadmium	50
	Phenol	370 uglkg		Chromium	326
				Lead	280
				Naphthalene	44
				1,1,1-TCA	770
				1,1-DCA	640
				1,1-DCE	42
				1,2,4-Trimethylbenzene	23
				1,3,4-Trimethylbenzene	12
				1,3,5-Trimethylbenzene	100
				1,1,2,2-PCA	100
				Chloroform	24
				PCE	102
				TCE	53
				VC	15

Screening Criteria Exceeded

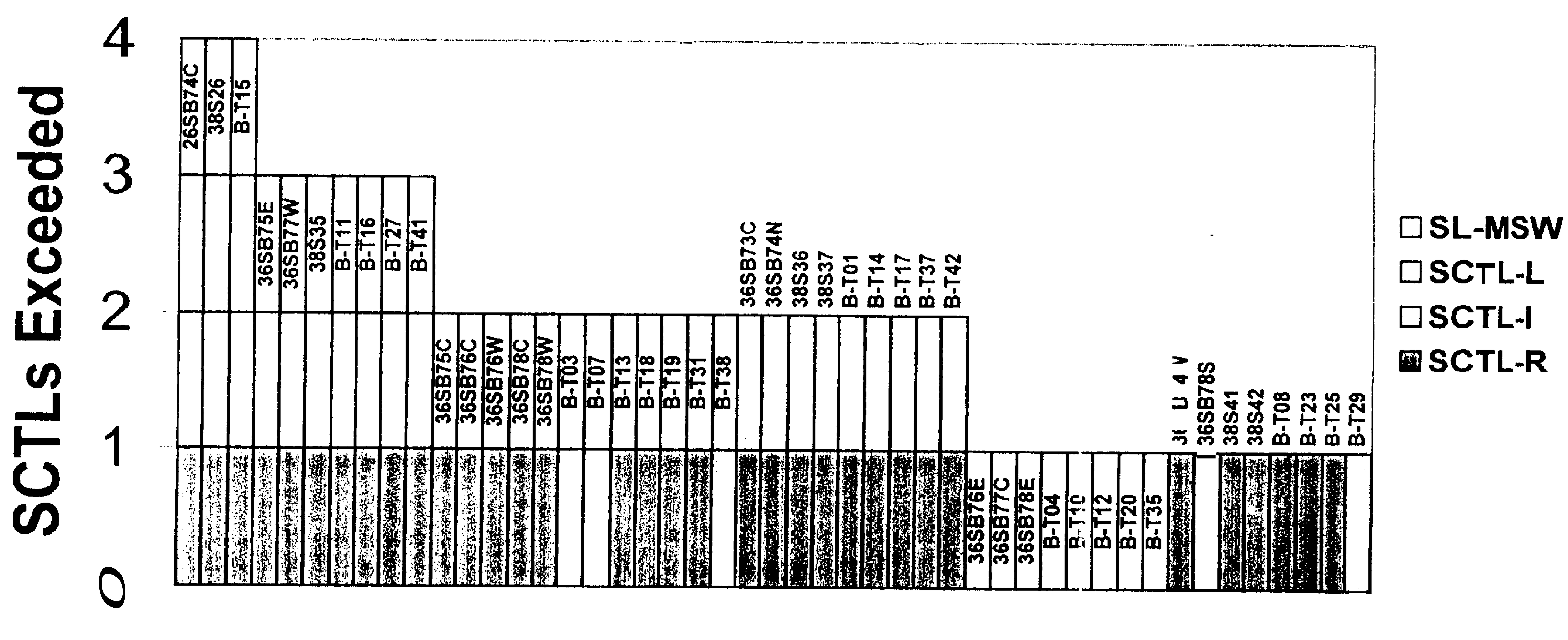
STCL – Residential

STCL – Leaching (GW)

STCL – Marine Surface Waters

BOLD – Both Soil/Groundwater Contaminant

Site 38 Soil Boring Summary - Building 604



Site 38 Selected Soil Boring and Monitoring Well Data – Building 604

Boring	Contaminant	Conc.	Well	Contaminant	Conc. ug/l
26SB74C	Arsenic	1.2 mg/kg	38GS07	Lead	18.6
	BaP	270 uglkg		VC	6.2
	BaP		38GI07	No Excedances Reported	
	BbF				
	DBahA				
	BaP	4500 ug/kg	36MW73C	Lead	265
	BbF	8300 ug/kg	38GS18	Lead	71.2
	DBahA	800 ug/kg		2,4-Dinitrotoluene	2.0
	4,4-DDT	63 ug/kg		PCE	41/10
	Endosulfan I	2 uglkg		TCE	2017.6
	Endrin	13 ug/kg			
	Acenaphthylene	1800 ug/kg			
	Anthracene	1000 ug/kg			
	BaA	4500 ug/kg			
	BaP	4500 uglkg			
	BbF	8300 uglkg			
	Chrysene	4200 ug/kg			
	Fluoranthene	6700 uglkg			
	Phenanthrene	3100 uglkg			
	Phyrene	9300 ug/kg			
38S26	Arsenic	4.2 rnglkg			
	Vanadium	16.3 mglkg			
	BaP	f60 uglkg			
	Arsenic				
	Dieldrin	4.4 uglkg			
	Mercury	0.6 mglkg			
	Dieldrin	4.4 ug/kg			
38S35	Arsenic	21.1 mglkg			
	Vanadium	18 mglkg			
	Arsenic				
	Mercury	0.23 mg/kg			
36SB73C	BaP	210 uglkg			
	Methylene Chloride	730 ug/kg			
36SB74N	Arsenic	6.4 mglkg			
	Copper	607 mglkg			
	Iron	24900 mg/kg			
	Lead	949 mg/kg			
	Arsenic				
	Lead				
38S36	Arsenic	3.7 mglkg			
	Vanadium	39.8 rnglkg			
	Arsenic				
B-T19	Arsenic	1.9 mglkg			
	Mercury	0.5 mglkg			

Site 38 Selected Soil Boring and Monitoring Well Data - Building 604					
Boring	**Contaminant**	**Conc.**	**Well**	**Contaminant**	**Conc. ug/l**
B-T27	BaA	2600 ug/kg	38GS14	Cadmium	14.5
	BaP	2200 ug/kg		Lead	118
	BbF	1400 ug/kg		PCE	20
	BaP			TCE	19
	BaA	2600 uglkg	38GS15	Lead	52
	BaP	2200 ug/kg		Naphthalene	140
	BbF	3800 ug/kg		1,1-DCE	180
	Chrysene	2200 ug/kg		Ethylbenzene	89
	Fluoranthene	3700 ug/kg		VC	41
	Pyrene	3500 ug/kg	38GS17	Lead	65.2
	Mercury	0.07 mg/kg		Naphthalene	24
B-T41	Copper	210 mg/kg		1,1-DCE	21
	Cadmium	17 mglkg		1,2-DCE	460
	Mercury	0.23 mg/kg		PCE	110
B-T42	Copper	190 mg/kg		TCE	19
	Cadmium	21 mglkg		VC	3700
	Chromium	40 mglkg	38GS19	Antimony	60
	beta-BHC	56 ug/kg		Cadmium	382
	delta-BHC	300 ug/kg		Chromium	544
36SB75E	Arsenic	5.1 rnglkg		Lead	180
	Copper	391 mglkg		1,2-DCE	130
	Lead	579 rnglkg		1,1,2,2-TCA	240
	Arsenic			TCE	41
	Mercury	0.34 mg/kg		VC	29
	Dieldrin	1.40 ug/kg	38GS20	Cadmium	34.1
	Endrin	9.9 ug/kg		Chromium	378
36SB75C	Arsenic	3.6 mglkg		Lead	110
	BaP	310 uglkg		1,2-DCE	970
	Endrin	2.7 ug/kg		TCE	14
	Mercury	0.09 mg/kg		VC	1100
36SB76C	Arsenic	2 rnglkg	38GS21	Cadmium	336
	Endrin	1.8 ug/kg		Chromium	297
	Mercury	0.15 mg/kg		Lead	639
				1,2-DCE	100
				PCE	280
				TCE	13
				VC	15
			38GS22	PCE	7
				TCE	9
				VC	15

<u>Screening Criteria **Exceeded**</u>
STCL - Residential

STCL - teaching (GW)
STCL - Marine Surface Waters
BOLD – Both Soil/Groundwater Contaminant